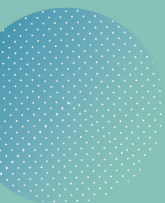




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Di-Higgs production via Axion-Like Particles

by F. Esser, et al. (including A. Salas-Bernárdez)

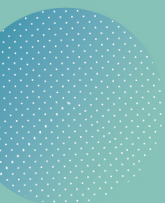
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Abstract

Due to the pseudo-scalar nature of the axion-like particle (ALP), the CP-conserving production of two Higgs bosons via the ALP necessarily involves an additional Z or γ boson. We examine the existing constraints from di-Higgs searches at Run 2 of the LHC and find that, despite the presence of extra objects in the final state, these searches are sensitive to a combination of ALP couplings to gluons and three-bosons in the TeV scale range. This production process can also occur through a coupling between the top quark and the ALP. We translate the current constraints on di-Higgs production into new limits on the ALP-top coupling. Additionally, we propose a specialized search strategy incorporating an energetic leptonic Z boson. This refined ALP-induced production process would allow for the identification of the h, h , to $4b$ -jet final state and could potentially probe the TeV scale using data from Run 2 of the LHC.

